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PAMPHLET A.

THE MUNSON METHOD

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POWER TYPE-COMPOSITION.

A DESCRIPTION OF THE METHOD AND ITS MACHINES, AND OF THE MANNER IN WHICH THE MACHINES ARE OPERATED IN PRACTICE; ALSO A STATEMENT OF THE KINDS OF TYPE-COMPOSITION THAT THE METHOD CAN DO, WITH CAREFULLY PREPARED ESTIMATES OF THE COST OF ITS WORK.

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THE MUNSON METHOD OF POWER TYPE-COMPOSITION.

The Munson Method of Power Type Composition has recently been greatly simplified and improved by the inventor, removing from it all of the features that had been criticised or excepted to by any of the practical printers who had examined it; so that he feels assured that, in its present shape, it will prove to be A PERFECT SOLUTION of the problem of economical machine composition which is now receiving so much notice, both from those who are in the business of printing, and from the public at large.

The special attention of printers is, therefore, again respectfully asked by Mr. Munson to his typographic inventions, as they now stand, and as they are here briefly described.

OTHER TYPE-SETTING OR COMPOSING MACHINES.

All type-setting or composing machines, of whatever character or description, that have hitherto been made and offered to the public, have been limited in their capacity for work by the ability of the operator. However good a machine may have been; whatever its mechanical capacity for speed might be; whether it could do six, eight, ten or even twelve thousand ems an hour; in actual practice it always fell far below that speed, for the reason that the operator could not make it do more work than a comparatively small part of its ultimate capacity, the amount varying according to his skill or diligence or both.

The average rate at which skilled operators, working from ordinary "copy," can manipulate a keyboard composing-machine of any kind, for any length of time, is not greater than 4,000 ems an hour. Occasionally an exceptionally expert operator may be found who will exceed that amount. But there are many others

who can never reach even that figure. The consequence is that from one-half to three-quarters of the capacity of a well constructed machine remains idle.

The object of Mr. Munson's inventions is to overcome this radical defect in type-setting machinery and to make it possible always to work it up to its absolute maximum speed.

MACHINES USED IN POWER COMPOSITION.

The machines used in connection with Mr. Munson's Method of Power Type Composition are of three kinds; namely,

First—A Preparatory Perforating Machine.

Second—A Type-setting Machine.

Third—A Type-distributing machine.

The preparatory perforating machine is a small, cheaply constructed and very simple affair. It is provided with a keyboard that can be worked by any typewriter operator, at any time or in any place, and the result (a strip of perforated paper) can afterwards be used to operate the type-setting machine; so that, by this plan, two, three or possibly more persons, can be employed simultaneously in keeping one type-setting machine constantly at work.

The type-setting machine is a simply constructed piece of mechanism, resembling several other type-setting machines, except that it is worked automatically and not by means of a keyboard.

The type-distributor is entirely automatic in its action.

The ordinary price at which type-setting machines have heretofore been sold is in the neighborhood of $3,000 apiece; and their average production has never been more than thirty-five or forty thousand ems a day. A complete working set of Mr. Munson's type-setting machines can be afforded for that sum, or even for less, and their capacity will be from one hundred to one hundred and twenty five thousand ems a day. This will reduce the cost of composition to about nine cents a thousand ems, where labor is paid as highly as it is in the City of New York, and to about six cents a thousand ems, where it is paid as it is in the country districts of say New England or Ohio.

Each of these machines is very simply constructed; is not liable to derangement; is strong in the parts where wear is likely

to occur, and requires no particular skill on the part of the operator or machinist. Should any part break it can be remedied by any competent iron-worker in the neighborhood.

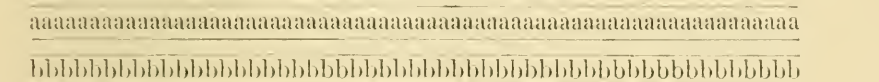
PARTS THAT ARE COMMON TO ALL MACHINES.

The following brief statement in regard to the construction of type-setting machines will aid in getting a better understanding of the difference between ordinary keyboard machines and the power type-setting machine of Mr. Munson.

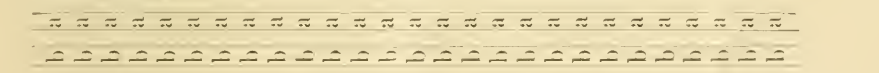
A type-setting machine is a machine by means of which types are set in line, in proper order, so as to form words and sentences to correspond with the matter contained in the "copy."

The essential parts of every such machine, whether operated by hand or otherwise, are the following:

I. A series of type-reservoirs, each of which is assigned to the exclusive storage of some particular letter, point, space or other type, of the machine's font. There are as many type-reservoirs as there are different types or "sorts" in the font. In each reservoir the types are arranged one against the other, with their face ends all pointing one way and their bodies all the same side up—that is, with their nicks always turned in the same direction. In some machines the types are placed, just as they come from the foundry, with their faces side by side; thus,



and in others they are arranged upward and downward of the faces; thus,



II. A series of type-pushers, one of which is located at the outlet of each of the type-reservoirs, with which a single type may be ejected at will from any particular reservoir.

III. Means for conveying such ejected types, one after another, in the order of their ejection from the reservoirs, to the forming point of the line of type, where, as has been mentioned, they are arranged in words and sentences.

IV. A "stick" or narrow channel in which such line of type is formed, held in shape, and moved along to make room for other types as they come from the reservoirs to the line.

Now, it is evident from the foregoing statement that the real, practical speed at which type may be set by *any* machine depends in the first place upon the rapidity with which the type-pushers are made to do their work. It has been found that the average number of types—letters, spaces, quads, etc.—in a thousand ems, is 2,180 (Lynch's Printer's Manual, p. 63). Hence, in setting type with a machine at the rate of 1,000 ems an hour, an average of $36\frac{1}{3}$ type-pushers must be operated a minute. So, in setting at the rate of 3,000 ems an hour, 109 type-pushers would be called into play every minute. And, generally, the multiplying of $36\frac{1}{3}$ by any number of thousand ems per hour will give the number of type-pusher actions that are required each minute to do that amount of work. Thus, discarding fractions, we have the following results: 2,000 ems an hour require 73 type-pusher actions a minute; 4,000 ems, 146 actions; 5,000, 182; 6,000, 218; 7,000, 255; 8,000, 291; 9,000, 327; 10,000, 363; 11,000, 400; 12,000, 436; 13,000, 472; 14,000, 509; 15,000, 545.

These figures show in a striking manner how very far the human operator, with his physical limit of 146 types set in a minute, or of 4,000 ems an hour, must of necessity always fall short in getting the full amount of work from properly constructed type-setting mechanism of which it is capable. Nothing but "POWER" can possibly do it. And Mr. Munson has succeeded in applying Power to type-setting, just as effectually as Jacquard applied it to figure-weaving, when he invented the loom which bears his name, nearly a century ago, and set it to work to do weaving that had previously been done by hand-looms.

THE MUNSON POWER TYPE-SETTING MACHINE.

The Munson Power Type-Setting Machine differs from all other type-setting or composing machines in that IT IS OPERATED ENTIRELY BY MECHANICAL POWER.

That is, it has no keyboard, and requires no one to aid it manually in doing its work, as it is controlled in its operation

by perforations in a ribbon or narrow strip of paper, and not by the fingers of a human operator.

AUTOMATICALLY it does the following things:

1. It sets matter in a long, continuous line of type, this line consisting of a succession of separated short lines, each of which has the requisite length and the proper terminal division to make it, when spaced and justified, a correct and suitable column line.

2. It spaces evenly and justifies with exactness each of such column-lines, and then deposits it with the column of type on the galley.

3. When matter is required to be leaded, it inserts leads between the lines of type as they are moved on to the galley.

THE MUNSON "COMPOSITOR'S MACHINE."

The perforations in the ribbon of paper are made on what is called the "Compositor's Machine," by means of a set of steel punches, that are operated in connection with a keyboard, in which there is a separate and properly labeled key for each type of all the "sorts" used in the type-setting machine.

The keys of the "Compositor's Machine" are made interchangeable, so that, at the option of the operator, they may be arranged substantially like those of any one of the various type-writing machines in use. For this reason there never can be any difficulty in securing the services of skilled operators on the "Compositor's Machine."

Another very important consideration is that this "Compositor's Machine" is a very inexpensive one, costing less to build than a Remington or a Caligraph writing-machine.

How the "Compositor's Machine" is Operated.

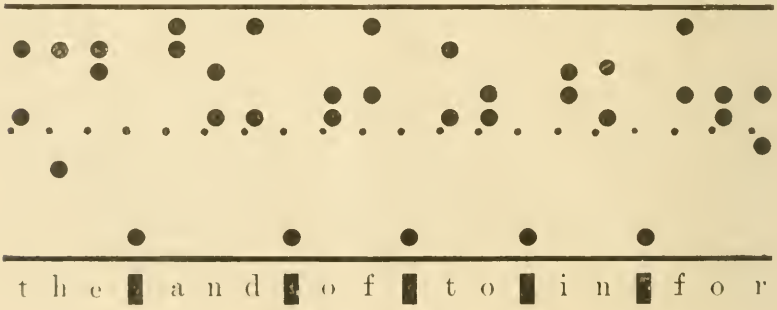
The operator of the "Compositor's Machine" sits at the keyboard with his "copy" before him, and proceeds almost precisely as if he were operating a type-writer or caligraph; but the results obtained, instead of being type-written letters, are merely a series of transverse rows of perforations in a ribbon of paper.

To each letter, point, figure, space, quadrat, etc., is assigned a particular row of perforations in the ribbon; the rows being made to differ from one another by changes in the combinations of their perforations. The operator has only to see that he depresses the proper keys, in their right order, the machine itself taking care of the combinations and insuring the correct perforation of the ribbon.

The operator determines as he goes along where each column-line of type shall end, in substantially the same way that a typewriter operator decides where each line of typewriting shall end. That is, he is guided by an index moving along a graduated scale, and also by the sound of a bell that is struck automatically a little before the end of the line is reached; just as the typewriter operator is guided by the "carriage scale," index and bell of that machine. When the end of a column-line is thus fixed upon by the operator, (whether the division comes after a word, after a hyphen dividing a word or after a point, figure or other character), he marks the terminus of the line by touching a key that causes to be inserted at that point in the ribbon a row of perforations that represents a peculiar type, called the "line-divider." He then proceeds in like manner to compose the next line.

THE RIBBON AND HOW IT LOOKS.

The following illustration shows how words and spaces are indicated by perforations in the ribbon. The line of letters and raised spaces immediately below the cut furnishes a key to each letter and space represented in it.



The composition of matter is indicated by the large holes, each combination of which, taken crosswise of the ribbon, represents some particular letter, space or other type, and will cause that type to be set in line by the type-setting machine. There are ten different points across the ribbon where a hole may occur; and the ten holes that may be inserted at those points are numbered from the upper edge of the ribbon downward, one to ten respectively. All the holes of a combination, whether there be one, two, three or more, in doing their work of setting a type, act simultaneously. Thus, the combination of holes 2 and 5, acting together, will set the letter t; holes 2 and 7, the letter h: 2 and 3, the letter e, and the single hole 10, the "thick" space.

The longitudinal row of small holes along the middle of the ribbon is called the "feed-row." Acting in connection with sprockets on a ratchet-wheel it causes the perforated ribbon to move through the automatic selecting mechanism of the type-setting machine with the utmost regularity and precision.

When desirable the different "takes" of perforated ribbon prepared by several compositors may be pasted together and fed into the type-setting machine as one continuous ribbon.

The ribbon is prepared in the same way for all sizes of type. That is, a ribbon that will set brevier, will also set either pica or agate, or any other size of type. It follows, therefore, that composition for any and all sizes of type may be done on one "Compositor's Machine."

Not Necessary to be Able to Read the Ribbon.

It is not required that the operator of the "Compositor's Machine," or, in fact, that any of the employees about the machines, shall be able to read the perforations in the paper, as the ribbon, just as it comes from the "Compositor's Machine," without alteration or change, may be used to operate the type-setter. The ribbon becomes, as it were, a part of the type-setting mechanism.

Printer's Corrections Made in the Type.

Proofs may be pulled from the column of type, after it is set by the machine, and then read with "copy," in the ordinary way, and correction of errors made in the metal.

Printer's Corrections Made in the Ribbon.

At the same time, if the printer should prefer to do so, the perforations in the ribbon may be read with "copy," and all corrections be first noted on and afterwards made by additional perforations in the ribbon.

TYPE USED WITH THE MUNSON MACHINES.

The type used with the Munson Power Machines is the ordinary type made and sold by all type-founders.

RECENT IMPROVEMENTS IN THE METHOD.

In the Munson method of type-setting, as it has been heretofore publicly exhibited, the work of reading with "copy," of making printer's corrections, and of spacing and justifying the lines, was of necessity done in connection with the ribbon; and hence it was indispensable that the workmen should be able to readily decipher the perforations in the ribbon; also that unit-body type, that is, type similar to the "self-spacing" type of Benton, Waldo & Co., of Milwaukee, should be used.

But now that the type-setting machine itself will mechanically do the justifying, and that all corrections may be made in the types on the galley or stone, it is no longer necessary that any of the operatives shall learn to read the composition on the ribbon, or that type of a special make or peculiar body shall be employed.

In fact, it is believed that the *method* is now absolutely perfect. That improvements in mechanism will from time to time be made, there can be no doubt; but the *manner* of doing the work is already as simple as it ever can be made. That is to say, whereas formerly three machines were required in preparing the ribbon for use in operating the type-setter—two automatic perforators besides the keyboard machine—now the entire work of perforation is done on one, namely, the compositor's machine.

COMPOSITION DONE BY THE POWER METHOD.

The power method of type-setting is particularly well adapted to any ordinary, plain composition; that is, work which does not call for a variety of sizes of type.

Any kind of tabular or column-work may also be done by it with much greater facility, and with more exactness than by hand, unless the hand-compositor bestows an unusual amount of care upon his work. Successive columns of figures, such as are found in the financial and market reports of newspapers, present no obstacles whatever to the method, and may be composed on the ribbon almost with the rapidity of plain matter. The type-setting machine will, of course, set the types of such matter with the same speed that it will do plain work.

MACHINES FOR TWO SIZES OF TYPE.

Machines may be made that will set two sizes of type, as for instance brevier and nonpareil, changing from one type to the other at the will of the compositor, as expressed in the ribbon.

Such machines will, therefore, be found useful in setting matter in which there is an occasional quotation or citation, which requires a smaller type than the regular size.

THE MUNSON POWER TYPE-DISTRIBUTOR.

The Munson Power Type-Distributor, when completed, will be greatly superior to any that has yet been constructed. Its main features will be as follows:

It will be entirely automatic. That is, it will not require the "dead" matter for distribution to be fed into it by hand, line after line and one line at a time, as is the case with some distributing machines; but a whole page or column of type may be placed on its table and the machine itself will do the rest. It will separate the foremost line of type from the others, and then pick off each individual type in that line and place it in its proper reservoir, putting all the a's in the a-reservoir, all the b's in the b-reservoir, all the M's in the M-reservoir, all the commas in the comma-reservoir, and so on until the entire page or column is distributed into type-reservoirs, ready to be placed in the type-setter again. The machine will do all this work with great rapidity, and yet so gently that no type will be broken or in any way disfigured.

SPEED OF MACHINE COMPOSITION.

SPEED OF KEYBOARD COMPOSING MACHINES.

The maximum speed-capacity of any machine that is operated by hand through a keyboard, is not determined by its inherent or mechanical speed-possibilities, nor by the amount of work that *specially skilled operators* can do upon it. But it is determined and limited by the amount of work that the *average operator* is able to perform upon it in a given space of time. In other words, to a printer who uses keyboard type-setting machines, the real speed-capacity of a machine is identical with the average speed of all the keyboard operators in his employ. For instance, if he has seven machines worked by seven keyboard operators, and those operators average per hour, respectively, say 3,500, 3,400, 3,350, 3,150, 3,000, 2,950 and 2,850 ems, the practical working capacity of the machine is not 3,500 ems, but it is the result obtained by dividing the sum of all these amounts by seven, viz., 3,164 ems per hour. And this would be true even if each of the machines had an inherent capacity of 12,000 ems an hour, in which case nearly 9,000 ems an hour of its possible speed would be absolutely unavailable, and, therefore, entirely lost.

Speed of the Munson Power Type-Setting Machine.

On the other hand, the Munson Power Type-setting Machine, being operated solely by steam or other power, may be run continuously and uniformly at very near the top of its inherent or mechanical speed-capacity, only a small "margin of safety" being allowed off from its utmost capacity.

Now, what is the real or available speed-capacity of the Munson Power Type-setting Machine? It may be easily ascertained and with exactness, by considering the following facts:

1. The ribbon with its perforations, being substituted for the mind and fingers of the operator of a keyboard machine, selects the types to be composed, in proper order, and causes them to be set in line, with a speed that is unlimited save by mechanical considerations.

2. The automatic mechanism that is operated by means of the ribbon corresponds with and takes the place of the keyboard and its attachments with which the types are set.

3. A type is set at each revolution of a small shaft in the machine. This shaft is scarcely an inch in diameter, and it takes so little power to revolve it that it may be easily turned between the thumb and finger.

4. Operated with power the shaft has already been run at the rate of 500 revolutions a minute, and at the same time it did its work perfectly.

5. As has been already stated, the average number of types in a thousand ems is 2,180.

Summary—$500 \times 60 = 30{,}000$ (number of types set in an hour): $30{,}000 \div 2{,}180 = 13{,}761$ (number of ems set in an hour).

That is to say, Mr. Munson's very first attempt to build automatic mechanism with which to set type, resulted in a machine that has been successfully run, by means of the perforated ribbon, at a speed of nearly 14,000 ems an hour.

But, in making the estimates of cost contained in this statement, only 363 types a minute, or 10,000 ems an hour, have been allowed as the capacity of the machine.

At the same time, in view of these calculations, and of what has already been accomplished, there is no doubt that, in the near future, a machine will be constructed, according to the Munson method, that will set without fault at least 15,000 ems an hour. In order to attain such a result as that, it may readily be seen that it will only be necessary to so construct the type-setting mechanism that the types as they are ejected from their reservoirs will all pass to the line in the "stick" in exactly the same measure of time, and then to secure 545 revolutions of the operating shaft per minute.

Many of those who have observed a power-press in a newspaper establishment, printing paper on both sides and cutting, folding and delivering the sheets at the rate of 36,000 per hour—ten a second, or 600 a minute—must have been impressed by the thought that the attainment of a corresponding speed in type-setting is only a question of mechanical ingenuity.

In this connection it should be noted that type-setting machinery is of such a character that it must of necessity be very much more efficient when driven with the absolute regularity, evenness and precision of automatic power, than when it is

operated by hand-movements, which naturally are always lacking in these particulars, and especially so when they are made with extreme rapidity. Almost all of the clogging of types and the consequent vexatious delays in the operation of hand type-setting machines, result from the striking of two keys simultaneously—a thing that cannot possibly occur in the Munson machine.

A compositor working with an ordinary keyboard type-setting machine loses time in looking at and deciphering his "copy," in spelling difficult or ambiguous words, in punctuating correctly, in efforts to strike the right keys, in looking to see if the types are being set properly, etc., etc.; and it will frequently happen that there is a loss of from one to two seconds when no assignable reason can be given for it. This occurs with every machine, and with every operator—with the type-writer as well as with all type-setting machines.

Then again, the operator of a keyboard machine will strike two or more keys so nearly simultaneously that one of two things will happen; either a letter will get into line ahead of one that it should follow, or the two letters will wedge together and clog the machine, causing thereby serious delay.

But if, as is the case with the Munson machine, the type-pushers can be operated with regularity, with a rhythm similar to that found in music—three, four, five, six, seven, eight, nine, ten in a second—then the number of types that can be set in a given time will be very much greater than can possibly be set by the most expert operator on any keyboard machine.

If three letters are set every second, it is equivalent to nearly five thousand ems an hour (this being the extreme practical limit of the most expert hand-machine composition); four letters a second will give six and two-thirds thousand ems an hour; five letters a second will amount to over eight thousand ems an hour; seven letters a second, to eleven and a half thousand ems an hour; eight letters a second, to over thirteen thousand ems an hour; nine letters a second, to nearly fifteen thousand ems an hour; while ten letters a second (being exactly the speed of the printing-press already mentioned) would foot up sixteen and a half thousand ems an hour.

COST OF COMPOSITION BY THE MUNSON METHOD.

The following is a conservative statement of the entire cost of composition by the Munson Power Type-Composing Machines, inclusive, from the perforation of the ribbon to, first, the placing of a column of justified and corrected type on the galley, ready for use in printing, and, finally, to the distribution of the same type back into their proper reservoirs, ready to be reset. This statement is the result of estimates very carefully made, after consultations with practical printers who have had long experience with hand or keyboard type-setting machines and automatic distributors, and obtaining from them full and trustworthy data upon which to base the calculations.

Cost per 1,000 Ems.

Item 1.	Cost of perforating the ribbon	$0 06
" 2.	" setting the type automatically	0 01
" 3.	" correcting in the metal	0 01
" 4.	" distributing the type automatically	0 01
	Total cost per 1,000 ems	$0 09

Details of the Calculations.

These are not fanciful or exaggerated figures, nor are the amounts loosely stated. Neither does the element of "cheap labor" enter into the reckoning, for each of the operatives is supposed to be paid $18 a week wages. But, in order that any one may follow and test the accuracy or reasonableness of the calculations, their details are here given.

The amount of Item 1 (six cents) is based upon the following premises:

1. That the "Compositor's Machine" for perforating the ribbon may be operated as fast at least as a type-writer. This has been demonstrated to be true with the machine already made.

2. That the average speed of type-writing, the operator working with "copy," and not from dictation, is about twenty folios or two thousand words per hour.

3. That a working week consists of fifty-nine hours.

4. That there is an average of 380 words to a thousand ems. (Lynch's "Printer's Manual," p. 63.)

SUMMARY—2,000 × 59 = 118,000 (number of words perforated in the ribbon in a week by one operator). 118,000 ÷ 380 = 310 (number of thousand ems perforated in a week by one operator). $18.00 ÷ 310 = $0.058 (or, in round numbers, six cents per thousand ems).

The amount of Item 2 (one cent) is based upon the fact that three power type-setting machines will set, at least, eighteen hundred thousand ems in a week, and the reasonable certainty that one attendant will be able to take entire charge of the three. Now, $18.00 ÷ 1,800 (thousand ems) = $0.01 (cost per thousand ems).

The amount of Item 3 (one cent) is based upon the result of the experience of practical printers in the use of hand type-setting machines; also upon the fact that in newspaper offices, where ordinary hand-composition is used, that is the allowed cost of such work.

The amount of Item 4 (one cent) is based upon the facts that four power type-distributors will distribute, at least, eighteen hundred thousand ems in a week, and that one attendant will be able to take entire charge of the four. Again, $18.00 ÷ 1,800 (thousand ems) = $0.01 (cost per thousand ems).

The estimate of number of words per 1,000 ems that is adopted in New York newspaper offices is very much less than the number (380) on which these calculations are founded; it being 338 words per 1,000 ems in minion, and only 300 words in either nonpareil or agate. Calculations based on these latter figures will illustrate the greater economy of the power method of type-setting, inasmuch as the nine cents, mentioned in the foregoing estimate as the total cost of composition per 1,000 ems, will be reduced to less than eight cents.

INCREASED AMOUNT OF WORK TO BE DONE.

In connection with this question of economy should be considered the effect of the new method in increasing the volume of work. This increase will be the natural result of the reduced

cost of composition. A vast number of private papers that now are prepared either in ordinary manuscript or in typewriting, will be put in type and printed, when the additional cost of so doing is but trifling.

Again, the new method will not only produce the natural increase of work resulting from economy of production, but there will follow remarkable progress growing out of the radical change in the *manner* of doing work. The fact should be recalled that the entire operation of preparing the perforated ribbon may be performed in one place, the ribbon afterwards being transmitted to another place, there to be used in operating the type-setting machine. Every act, therefore, connected with type composition, except the mere automatic setting of the pieces of metal, may be performed in any convenient place.

One of the largest and most important fields of usefulness that will, in time, be thrown open to the new invention, is the putting in type of public records, such as deeds, mortgages, wills, etc.; the cost being no more, and probably less, than the present expense of engrossing them in libers. The great importance to the public of having such records printed, so that duplicate copies may at all times be in existence, was strikingly exemplified by the total destruction of the records in Chicago, at the time of its great fire, by which catastrophe the titles to much of the real property of the city were seriously imperiled. A like calamity is liable to overtake any of our cities at any time.

The printing of public records, however, never can become economically practicable, with the ordinary method of setting type, no matter how cheap the work may be done, because, on the one hand, it would not be proper for the official in charge of the records to allow original papers to go out of his possession to a printing office, and, on the other, the making of extra copies for the use of the printer would cost almost as much as it would to engross them directly into the books of the office. With the new method the operating ribbon may be prepared on the compositor's machine, in the office of the custodian of the records, directly from the originals, without soiling or injuring or in any way endangering their safety. All subsequent machine work would, of course, be done at the office of a printer.

REPRODUCING THE RIBBON BY TELEGRAPH.

It is also proposed to connect the working of the power type-setting machine with the electric telegraph, in the following manner:

The ribbon, after it has been prepared on the "Compositor's Machine," may be reproduced by telegraph at or from a distant point. For instance, a ribbon prepared by a compositor in Washington might be reproduced or repeated by telegraph, in exact *fac simile*, in every newspaper office in New York City, for immediate use in operating power type-setting machines located in those offices. In such case there would, of course, be required but one composition of the matter and one operation of telegraphing for all the newspapers included in the circuit.

When, however, the ribbon is used in this way, namely, in operating a telegraphic instrument to reproduce the ribbon at one or more distant points, then, in order that entire freedom from errors in the subsequent printing may be attained, it will be necessary, before telegraphing, to have the perforations in the ribbon read with the "copy," and all corrections of errors discovered by such reading inserted in the ribbon; because the type to be afterwards set by the *fac simile* ribbon and the original "copy" will be so far distant from each other that it will not be feasible to compare a "proof" pulled from the types after they are set with such "copy," for the purpose of making corrections on the galley. For this reason some, if not all, of the operatives who engage in preparing ribbon for the telegraph must be able to read the perforated ribbon with facility.

The value of such an achievement as this, namely, the reproduction of the operating ribbon by telegraph at any desired number of places, to companies engaged in the gathering and distribution of press news, such, for instance, as the "Associated Press," would obviously be very great, as it would enable them, with but a single complete composition of matter on one ribbon of paper, to simultaneously supply all their patrons or customers with perforated and corrected ribbons, ready for immediate use in operating their own type-setting machines.

Illustration:—The President at Washington might have his inaugural address composed and corrected on a single ribbon of paper, and that ribbon could be then used to operate a telegraphic instrument located in that city, thereby causing an exact duplicate of the ribbon to be made in every newspaper office within telegraphic reach, ready for immediate use in power type-setting machines, without further labor or expense of composition.

APPLICATION OF METHOD TO NEWSPAPER WORK.

The method of power type-setting is peculiarly well adapted to newspaper work, as is evident from the following facts:

With the exception of the corrections of proofs, which are made as in hand-composition in the metal, the entire work of type-composition is done on a small perforating machine which is operated with the fingers by means of keys, one for each denomination of type, placed in a properly arranged keyboard.

This machine resembles quite closely in its mode of operation, and also somewhat in its general appearance, an ordinary type-writer; but the results produced by it are simply perforations in a ribbon of paper. This perforating apparatus, appropriately called the "Compositor's Machine," is quite inexpensive, costing to build even less than a type-writer.

Then, again, as its keys are interchangeable, that is, so made that they may be arranged in any desired order, a skilled operator of any one of the type-writers now in use may transpose the keyboard to suit himself and work upon it without preliminary practice.

The ribbon is perforated exactly the same for all sizes of type; therefore, only one style of compositor's machine is required for the composition of all kinds of matter—editorials, news or financial reports, advertisements or what not.

"Matter" that has been composed on the compositor's machine is then in the form of rolls of perforated ribbon, which are about an inch in thickness and of convenient diameter.

A thousand ems of type of any size will require about eighteen feet of perforated ribbon; and a roll of such ribbon five inches in diameter will contain the equivalent of thirty thousand ems of type.

Although the perforations in the ribbon are perfectly legible, and may be learned in a short time, it is not requisite that any of the workmen, including even the operators of the compositor's machines, shall be able to read them. In fact, the ribbon with its perforations is simply a part of the type-setting mechanism.

The type-setting machine proper has no keyboard, but is operated by means of this prepared ribbon, which is run through the machine, causing it to set exactly the types that have been indicated in perforations on the ribbon.

The selecting mechanism whose action is controlled by the perforations in the ribbon is exceedingly simple, very durable, and works with great rapidity and with absolute infallibility. Whatever keys are struck by the compositor on his machine while preparing the ribbon are sure to be correctly represented and in proper order in the types when set.

After the types have been used, the distributing machine automatically replaces them in their reservoirs ready for immediate use again in the type-setting machine.

One of the most marked peculiarities of the new method is the complete separation that it permits, and will naturally bring about, between the location of the compositors with their perforating machines and the location of the type-rooms and the setting and distributing machines. Compositors will have no more to do with the actual setting and distributing of the type than hand-compositors now have to do with the press-work. They will occupy a room by themselves, and they need not know anything about type-setting or about the working of any of the machines except their own keyboard perforators.

Indeed, the manual work of type composition, aside from the correction of proofs, will be almost exactly like type-writing the "copy" of a newspaper, and the cost of the work will be just about the same.

As a good operator on a compositor's machine will in a given period compose five or six times as much matter as a good hand-compositor, it is evident that whatever may be the rush, there can never be any necessity for dividing "copy" into very small "takes," so that divisions on "paragraphs" will always be possible, and the open and irregular spacing that now so often disfigures our newspaper columns will disappear.

And right here the fact should be recalled to mind that a keyboard compositor will do much more work, and do it with greater accuracy, simply *because* he does not have to give attention to the type-setting; while the output of a properly constructed type-setting machine will be from three to five times as much, *because* it is not handicapped by the keyboard compositor.

The method is particularly adapted to any kind of plain composition, that is, work which does not call for a variety of sizes of type. It would be perfectly feasible to include italics and small capitals in the font of the machine, but the limited use made of them hardly warrants the additional expense that would be necessary in order to accommodate them there. Whenever it is desirable to employ them it may done in another way.

The following are some of the kinds of newspaper work for which the method is well adapted: Editorials, general news, financial and commercial news, tables containing columns of figures, sporting news, marine intelligence, marriages and deaths, market reports of all kinds, weather reports and tables, poetry, plain advertisements, etc.

When two-line letters are used at the beginning of advertisements the composition is done as shown in the illustrations below. The ribbon is so prepared that it causes the type-setting machine to set four ordinary capitals of like denomination for each two-line letter, two at the beginning of the first line and two at the beginning of the second line (see No. 1). Afterwards, and before the type is used, the four ordinary capitals in both lines are removed by hand and the single two-line letter inserted in their places (see No. 2). Then, before the "dead" matter is given to the automatic distributor, the two-line letter is removed and the four ordinary capitals restored to their original places (see No. 3). If there are two or more two-line letters or figures in an advertisement, the same course is pursued as to each.

No. 1. EENGINEER.—First-class, good mechanic and practEE tical machinist wants situation; is used to repairing and setting tees; is well recommended. Address

No. 2. ENGINEER.—First-class, good mechanic and practical machinist wants situation; is used to repairing and setting tees; is well recommended. Address

No. 3. EENGINEER.—First-class, good mechanic and practEE tical machinist wants situation; is used to repairing and setting tees; is well recommended. Address

If each two-line letter, figure, etc., is cast on a body exactly twice the width of its corresponding capital, figure, etc., of the regular font, no rejustification of the lines will ever be required.

Less type will be needed to run a newspaper by the new method than is now required; because, if necessary, the matter for an entire issue may be composed on the ribbon before the setting of a single type. The principal drain upon type with all our great daily newspapers, outside of the type that is in actual, immediate use, is in the overset matter of each day; in the composition during the week for the coming Sunday paper; in matter that is "killed," and sometimes, though not so much as formerly, in "bogus" matter. The amount of type constantly standing idle in a newspaper office runs all the way from 150 to 300 galleys, according to the size of the paper.

Although at present it is impossible to state with exactness how many machines of the Munson method, and workmen to operate them, will be required to do the type-setting of a newspaper, yet, calculating from the best data that is now available, it cannot be far out of the way to say that the composition work of a daily newspaper of the size and style of the *New York Tribune* could be done with from thirteen to fifteen compositor's machines and a like number of compositors to work them; from seven to nine power type-setting machines and two or three attendants to look after them, and from nine to twelve power type-distributors and two or three other workmen to attend to those machines.

The comparative cost of type-composition, as between hand-setting and work done by the Munson method, is shown by the following facts: It is estimated that seven daily morning newspapers in the City of New York conjointly put in type each week about 20,000,000 ems of plain matter. The other morning dailies, including those printed in German and French, will add about 6,000,000 ems more, making a total of 26,000,000 ems. If all that matter were set by hand, the cost would be in the neighborhood of $13,000 a week. By the Munson method of power composition, the cost per week would be a little less than $2,500.

Ribbon Received by Telegraph.

When the ribbon is telegraphed to several newspapers simultaneously, in the manner already described, the expense of composing the first ribbon, for use in operating the automatic transmitter at the distant telegraph office, as well as the cost of the actual telegraphing, will be divided *pro rata* among the newspapers.

The ribbon just as it comes from the telegraph instrument in each of the newspaper offices may be used without change by all the newspapers in operating their type-setting machines, and the matter will then appear exactly the same in all the newspapers, even to the hyphens at the ends of lines. But in order to avail themselves fully of this advantage the newspapers will have to act in harmony, and adopt a uniform width of column. It will be necessary for the compositor who prepares the ribbon for use in telegraphing, to divide it into column-lines of a standard width—probably 2¼ inches, as that width is more generally used than any other.

But, should a newspaper prefer not to conform to the standard width, it may still use the ribbon to set the type, and then do the justifying by hand, in the same way it is done now with type set by keyboard type-setting machines; the extra cost being about six cents per thousand ems.

APPLICATION OF METHOD TO BOOK WORK.

One of the principal benefits to be derived from the new method of type-setting will be the great lessening it will cause in the expense and trouble of issuing successive editions of books and other publications, for which it is not generally considered expedient to make electrotype or stereotype plates from which to print them.

And even as to many works that are now printed from such plates, unless it is anticipated that several editions will be required, it will be found cheaper to employ the ribbon to set the type anew for each edition, than to incur the expense of making plates.

As nearly all the manual work of the printer's composition is

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put into the ribbon, it follows that after the ribbon has been employed in setting the type for the first edition, it may be filed away for use in again setting the type for other editions, should any be demanded.

In the meantime, such corrections and alterations as the author may wish to make may be composed and inserted in the ribbon at their proper places.

But it will not be necessary for him to again go over and correct the proofs of the entire work, no matter how many editions may be needed; because the original ribbon, when once it has been properly prepared, will at all times, when required, cause the machine to set the matter correctly and in exactly the same way as before.

When it is desired to issue a publication simultaneously in two or more different places, duplicates of the operating ribbon may be prepared and forwarded by mail, telegraph, or otherwise, and then used in accomplishing that purpose, with great advantage, as they would save the publisher the trouble and expense either of making and transmitting extra plates, or of re-setting the type by hand at all the places of publication.

It Fits the New Copyright Law Exactly.

The new method of type-setting would also, so far as type-printed books are concerned, almost entirely relieve our international copyright law of its greatest hardship upon the foreign author, namely, the requirement that the two copies of his book to be delivered or mailed to the Librarian of Congress not later than the day of publication, in order to secure the benefits of copyright, "shall be printed from type set within the limits of the United States, or from plates made therefrom." The author will simply have two copies of the perforated ribbon of his book prepared simultaneously on compositor's machines in his own country, then retain one for his home edition, and send the other here to be used in setting the type of the American edition. While this arrangement will satisfy the demand of the law that the type be set in the United States, it will also relieve the author from the expense of having the same matter composed twice, and at the same time give him the satisfaction of knowing

that his book will be put in type exactly as he wants it done, even to the retaining of his peculiarities of orthography. Such duplicate perforated ribbons may be made with the labor of but a single composition, by simply running two thicknesses of the ribbon through the compositor's machine and perforating both at the same time.

APPLICATION TO STENOGRAPHERS' WORK.

The Munson method of power type-setting has important advantages for law stenographers, in the preparation of transcripts of short-hand minutes, which are not offered by any other method of machine composition. At present stenographers generally do this work on type-writers, and when extra copies are required they are made by manifolding with carbon sheets. Duplicate transcripts made in this way, however, are not even in quality. No matter how good the ribbon copy may be, the carbon copies decrease in excellence according to the number made, the quality and thickness of the paper used and the skill of the operator. And yet, while type-written work of this kind is not perfect, it is a great improvement upon the old manuscript and press-copy work of former years.

The great desideratum now is some means by which stenographers can economically and with the necessary speed furnish transcripts in ordinary print. Up to the present time, however, no satisfactory way of doing this has been afforded. When the trial of a case extends beyond a single day, it is sometime necessary that transcripts of the minutes of each day's proceedings shall be prepared at night and furnished to counsel on the following morning at or before the opening of court; in order to do which the stenographer requires the aid of several type-writers and operators. An expert operator of a type-writer will perform twice the amount of work in a day that the most rapid long-hand penman can do. Now, no keyboard composing machine has yet been made that can equal the type-writer in speed. Therefore, when we consider that every such composing machine costs $2,000 or more; that it will take a greater number of such machines as well as operators than it will of type-writers and operators to make the transcript of a given amount of stenographic reporting; that it is not practicable to move those machines about from one place to

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another as type-writers can be moved, and that they must always be driven by steam or other considerable power, it is quite obvious that no hand-operated composing machine can ever supplant the type-writer in connection with stenographic work.

But the Munson method of type-composition—with its small, portable and inexpensive compositor's machine with which to prepare the perforated ribbon for the transcript, and its rapid power type-setting machine to set the type for the same—meets the requirements of the case in every respect. The stenographer will prepare his record in perforated ribbon, requiring only the same number of compositor's machines and operators that he would of type-writers and operators for the same amount of work. He will prepare the ribbon on the compositor's machines in the same manner that he now makes transcripts on type-writers, at any place that suits his convenience—at his home, his office or elsewhere. He will then send the ribbon to a printing-office to be used there in operating a type-setting machine and putting the matter in type without his further presence. The "proofs" may be read and corrected at any time afterwards.

UNITED STATES AND FOREIGN PATENTS.

The Munson Method of Power Type Composition is protected by patents, both in this country and in several foreign countries. Upon an examination of the patents it will be found that they are unusually good ones. As Mr. Munson is the only inventor who has ever really accomplished anything of consequence in this particular field of automatic devices, there has been no one to interfere or clash with his work, and the result is that the claims that have been allowed him by the Patent Office are most of them very broad ones. For this reason he is relieved from apprehension of trouble from rival claimants, *because there are none.*

Other patents, for important improvements that have recently been made in the method and its machines, are about to be taken out.

For further information concerning the Munson Method of Power Type-Composition, address

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